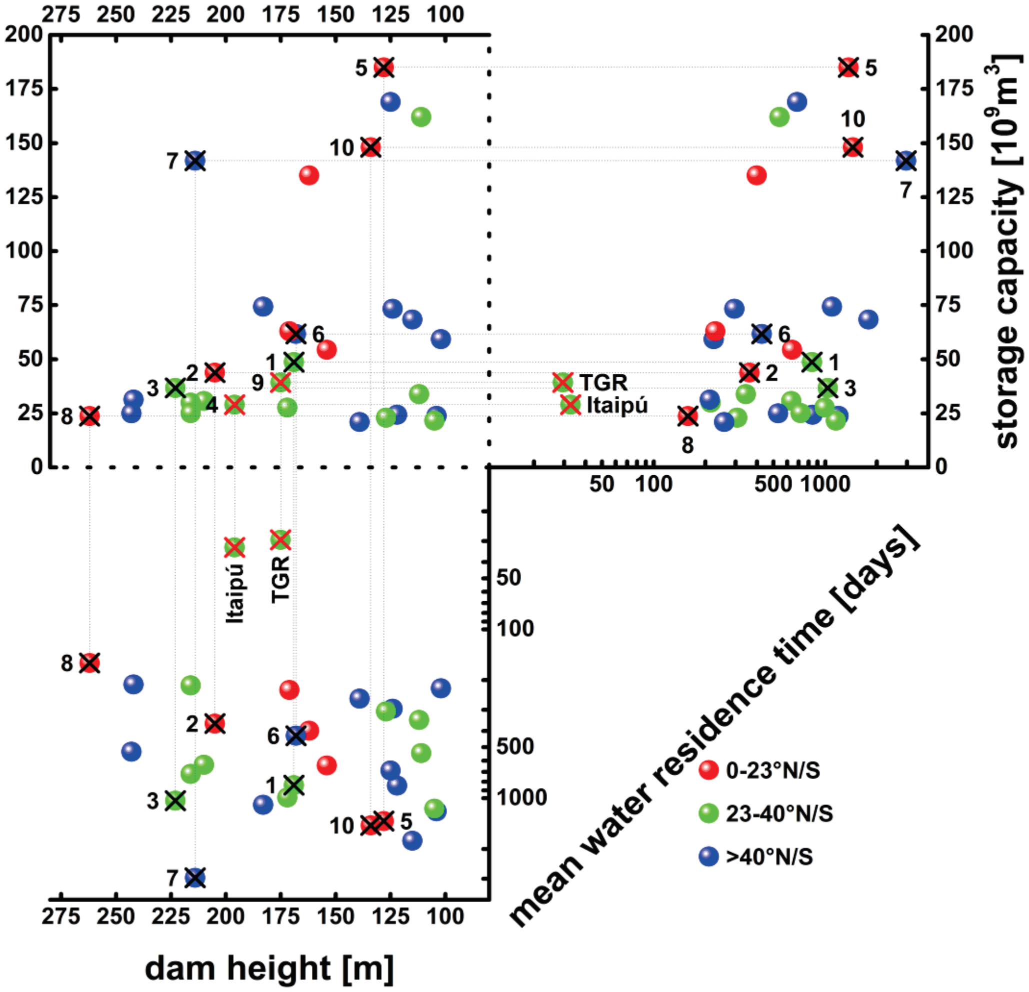
Environmental Science: Processes & Impacts

ARTICLE

Electronic Supplementary Information



ESI Fig. 1 Properties of dams and reservoirs worldwide with dam heights > 100 m and storage capacities > $20*10^9$ m^3. The TGR and the Itaipú Reservoir have comparable magnitudes, are located in the sub-tropics, and have exceptionally low mean water residence times.[1,42,43,44,45,46] Crossed and numbered points refer to ESI Table 1.

ESI Table 1 Properties of selected dams and reservoirs worldwide with dam heights > 100 m and storage capacities > 20*10^9 m^3. The TGR and the Itaipú Reservoir have comparable magnitudes, are located in the sub-tropics, have exceptionally low mean water residence times (MWRT), and are polymictic. The TGR, however, is eutrophic and has by far the largest water level fluctuation. Numbers (No.) refer to ESI Fig. 1.

				Dam and Reservoir dimensions				**Reservoir Classification**					
No.	**Dam name**	**Country**	**Year**	**Dam height [m]**	**Res. vol. [10^9 m^3]**	**Res. area [km^2]**	**Ø depth [m]**	**MWRT [days]**	**Geographic**	**Trophic**	**Mixing**	**WLF [m]**	**References**
1	Atatürk	Turkey	1992	169	49	817	60	838 long	37°N sub-tropical	eutrophic	n.a.	n.a.	[41,43,50]
2	Bakun	Malaysia	2011	205	44	695	63	362 intermediate	3°N tropical	n.a.	n.a.	n.a.	[41,44,46]
3	Hoover	USA	1935	223	37	635	58	1035 long	36°N sub-tropical	mesotrophic	monomictic	7	[41,43,47]
4	**Itaipú**	**Brazil/Paraguay**	**1983**	**196**	**29**	**1350**	**21**	**33 intermediate**	**25°S sub-tropical**	**oligotrophic**	**polymictic**	**1**	[41,43,44,45,48]
5	Kariba	Zimbabwe/Zambia	1959	128	185	5540	33	1367 long	17°N tropical	mesotrophic	monomictic	3	[41,43,44]
6	La Grande 2	Canada	1977	168	62	2835	22	428 long	54°N moderate	oligotrophic	dimictic	9	[41,43,44]
7	Manicouagan	Canada	1968	214	142	1940	73	2961 long	51°N moderate	oligotrophic	monomictic	6	[41,43,44]
8	Nuozhadu	China	2014	262	24	320	74	159 intermediate	23°N tropical	n.a.	n.a.	n.a.	[39,41]
9	**Three Gorges**	**China**	**2003**	**175**	**39**	**1084**	**36**	**30 intermediate**	**31°N sub-tropical**	**eutrophic**	**polymictic**	**30**	[41,43,49]
10	Volta	Ghana	1965	134	148	8500	17	1452 long	6°N tropical	eutrophic	polymictic	3	[41,43,44]

ESI Table 2 Sensors installed on the MINIBAT and their specifications.

Parameter	Producer	Principle	Measuring range	Accuracy	Resolution	Response time
Pressure	ADM Elektronik	piezo-resistive	0 200 dbar	±0.1 dBar	0.005 dbar	0.04 s
O_2	ADM Elektronik	Potentiometric (Clark electrode)	0 - 150% sat	±2% sat	0.02% sat.	3 s (63%)
Temperature	ADM Elektronik	Pt 100	-2 - 38°C	±0.01°C	0.001°C	0.12 s
El. conductivity	ADM Elektronik	7-pole-cell	0 - 6 mS/cm	±2 µS/cm	0.1 µS/cm	0.05 s
pH	AMT GmbH	Potentiometric (Ag/AgCl)	0 - 14 pH	0.02 pH	0.02 pH	1 s (63%)
H_2S*	AMT GmbH	Amperometric	0 - 10 mg/L	±3%	0.03 mg/L	<3 s
Chlorophyll *a***	Turner designs	Fluorescence (exc. 465 nm / fl. 696 nm)	0.03 - 500 µg/L		0.01 µg/L	1 s
CDOM***	Turner designs	Fluorescence (exc. 325 nm / fl. 470 nm)	0.15 - 1250 ppb_{QS}	±5%	0.01 ppb_{QS}	1 s
Turbidity	Seapoint sensors, Inc.	Mie backscattering	0 - 750 FTU	±2%	< 0.001%	0.1 s
PAR (400-700 nm)	LI-COR®	Photon flux density	0 – 10 mmol/(s*m^2)	±5%	0.01 µmol/(s*m^2)	10 µs

*The H_2S sensor did not operate stable and was not used during data evaluation. **Calibrated against algal monoculture of *Skeletonema costatum*. ***Calibrated against Quinine Sulfate in 0.05 M H_2SO_4.

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ESI - Notes and references

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